

What Difference Does Instruction Make?



How to write an excellent research
paper



Why this topic?

- We assume that when we teach, we are making a difference.
- The purpose of this project is for you to find out what kind of difference you may (or may not) be making.
- The skills you will learn in this assignment will help you in assessing your students as you teach.



Notes on the assignment

- This assignment is designed to be flexible. You can write it about any topic, any number of children (single child to whole classroom), any length of instruction (one session to six weeks), and any teacher (yourself, your classroom teacher, the music teacher, etc.).
- You can “piggyback” this assignment onto other assignments for Junior Block.
- Even if the whole class is present for instruction, you can focus your research on a small group of students.



Notes on the assignment

- Negotiate this assignment with your cooperating teacher. The teacher may have data that you can use and may have some ideas that will make the research project interesting. You might consider asking the teacher what he or she wants to know (e.g., is a math process making a difference? Is a reading method working?).



Examples of topics

- Writing letters, phonics, CGI math problems, poetry, branches of government, quotation marks, symmetry (geometry), parts of a plant, reading comprehension, reading program, spelling, subtraction, single digit multiplication, community helpers, vocabulary, reading and writing with ESL students



Collect data

- You need to collect data before you do the instruction. You cannot tell if your instruction made a difference without finding out what children know prior to instruction.
- You CANNOT do this research project without collecting data BEFORE the children have a learning experience.



Why do we collect data before?

- Good instruction meets kids where they are. If you don't know what they know, then you cannot teach them what they need to learn.
- If kids already know something, then don't waste time reteaching it.
- The Zone of Proximal Development lies between the known and the unknown. You need to know what kids know so you can gear your instruction to each child's ZPD.



Collecting data before

- You can look at what they know. This is knowledge.
- You can look at what they CAN DO. This is skill.
- Knowledge and skills are both important.



Be systematic

- You need to collect the data systematically. You need to know what **each child** in your research group knows before instruction.
- New teachers need to be able to explain what is going on with each child in your classroom and how your lesson addresses each child's needs. This research project will give you practice in this area.



Types of data

- Quantitative data: “quantity.” Numbers. This is data that can be reported using numbers, such as the score on a test or the number of mistakes a child makes in reading.
- Qualitative data: “quality.” This is data that is reported using words, such as ideas children have in a KWL, opinions children express about a topic, observations you make about children’s involvement in an experience.



Systematic collection

- You may collect either or both quantitative and/or qualitative data on what students know prior to the instruction.
- You must be systematic: you must make sure you know what is going on with each student in your research group.



Ways to collect qualitative data

- Audiotape or videotape a discussion
- Keep a checklist and note which children respond
- Immediately after discussion, write down what happened (while you can remember who said what).
- Let every child respond in writing to a question about the topic (e.g., “What do you know about ...?”)
- Give every child a KWL form to fill out
- Systematically observe children working in groups, using a clipboard and paper to note your observations.
- There are other ways that are good—whatever you invent for your setting.



Ways to collect quantitative data

- Give a pre-test (explain to the children why you are doing this—they don't like not knowing the answers).
- Use data the teacher has collected (e.g., running records, achievement tests, unit tests, homework, etc.).
- Use a worksheet.
- There are other ways you might find that are good for this.



Which type of data to use?

- Quantitative data seems to be objective and that can give a lot of authority to your research project.
- Qualitative data, however, is useful for confirming or casting doubt on the numbers.
- Remember that quantitative assessment has its problems. A child might do poorly on a test but have demonstrated a skill in one of your tutoring sessions. The demonstration would be qualitative data that challenges your quantitative findings.



Therefore...

- Strong research projects use both qualitative and quantitative data.
- It's always nice to know how kids FEEL about something—the reading they did or the math problems, or whatever. That is qualitative data and it is useful for you as a teacher to know.



Next: Instruction

- After you have collected your data about what students know or understand about a topic, it is time for them to have a learning experience.
- Any person can do the teaching: yourself, your cooperating teacher, another teacher in the building.



Instruction

- You need to record what the nature of the instruction was. What happened first? What happened next? How did the kids respond? Be specific, particularly about kids' responses.
- Remember, I will not have been in your classroom, so you need to give me lots of specific information.
- Also remember that you may be covering a topic in which I have no expertise (e.g., the newer ways of teaching math). Be sure you



Post-instruction assessment

- Now you need to assess again to see if the instruction made a difference.
- Consider using both qualitative and quantitative methods for collecting this data.
- For options, see the slides on your options for pre-instruction assessment (slides 9-10).



Quantitative data analysis

- Average your pre-tests (or whatever the pre-instruction assessment was) and then average your post-tests. See what the difference is between the two averages.
- Look at the range. Often what happens is that during the pre-test, you have some really low scores and some fairly high scores—a wide range. During the post-test, most of the scores may be clustered around a higher level—the range may have decreased.



Quantitative data analysis

- Sometimes a single score will alter the average significantly: one student does spectacularly well or spectacularly poorly. That is why it might be a good idea to figure out the median and the mode.
- The mode is the score with the most number of people who got that score.
- The median is the halfway point: 50% scored below and 50% scored above. A single weird score can't mess up the median.



Quantitative data analysis

- The easy way to figure statistics is to use an Excel worksheet. Put in your scores and get Excel to give you the average, median, and mode. Put your scores from a pre-test OR post-test in a column. Beginning with the blank cell below your scores, select the column. On the tool bar is a Sigma that says “Autosum.” If you place your mouse on the arrow beside the sigma, it will give you the possibility of averaging your data. Under “More Functions” you will find median and mode (and a huge range of other statistical possibilities). If you want to do more than one type of statistics, get the program to add a new cell beneath your column of data—the blank cell becomes where the program puts the answer. If you don’t use a blank cell, the program will replace some of your data with its answer. If you don’t keep adding a blank beneath your column, the program will add your previous statistic in with your data from your students. Play with this program—if you can get good at it, it will help you a lot.
- Excel will also graph your data for you.



Quantitative data analysis

- You might have more than just two data sets—you might have collected data during a long set of instruction (e. g., how a child did across several weeks of spelling instruction). In this case, you might consider making a graph that shows how the student changed during that period of time.



Quantitative data analysis

- Your data may tend to fall in groups. There may be a group of kids who do very well, a group of kids who are average, and a group of kids who are well below average. You can divide your data and track what happens with each group (average pre- and post- for each group of kids). Remember that if a child began in the “low” group, his/her data must be averaged with the other members of that low group for both pre- and post- tests.



Quantitative data analysis

- Think about what your data means. It's likely the kids that did well in the beginning are going to do somewhat but not spectacularly better in the end. It is possible that kids who scored poorly at the beginning can make huge gains. If everyone is making gains, then the teaching made a difference.



Quantitative data analysis

- Sometimes weird things will happen. A child who knew the whole alphabet at the beginning missed five letters at the end. When you see this kind of thing, you will really need to think about what happened. Was this a part of the instruction? Or was there something else going on? Was the assessment appropriate for the information you were trying to get?



Qualitative data analysis

- If you have a collection of statements from kids, you might be able to sort them in groups.
- The groups come from the data itself. For example, if kids tend to have positive and negative things to say about a topic, then you would sort their comments into those two groups.



Qualitative data analysis

- When you have your data sorted into groups, you might find that there are some subgroups that appear. For example, in the “negative” comments, you might find that three children had similar concerns or dislikes. If there are five negative comments in total and three of them are about one issue, then you can assume that issue is significant.



Qualitative data analysis

- It is a good idea to sort your data so you can be aware of all the issues that arise and how many students share those issues or experiences. Just “eyeballing” the data (glancing at each student’s response) doesn’t do the job—you might miss something. Systematically sorting your data helps you to keep from missing what is happening with the students.



Data analysis

- Think about how you will present your data. You might create a chart with your quantitative data and some explanation of how you got it. You also could create a chart with the types of qualitative data you collected. Graphs are fine, as well. Your chart or graph should offer the reader a sense of your data at a glance and your explanation should flesh out those ideas.



Implications

- This is the most critical part of the paper.
- There have been several thoughtful papers written about situations in which instruction did NOT work. The key to writing a successful research paper is NOT whether the teaching worked but, rather, how deeply you thought about what happened and why.
- The next few slides will provide questions for you to think about.



Implications

- Why did this teaching work or not work?
- What else could have been done?
- If something did not work, you will need to look very carefully at all the factors to figure out what happened.
- Did the assessments (pre- and post-) work?
- What other ways could you have assessed?
- Did kids demonstrate their knowledge in more than one way? How?



Implications

- Who made the most progress? Why?
- How did the progress made compare with the state/local expectations for progress at this grade level in this subject?
- What are the differences between the kids who improved the most and the kids who improved the least?



Write-ups

- Student samples really add to the believability of your writing.
- Use examples of individual children as you explain what happened and why.



Writing

- You have a lot of details to write. Take your time.
- Divide your work into sections that make sense to you (e.g., methodology, data analysis, etc.).
- Some of the sections can be written in advance of finishing the research. Don't procrastinate—write each section as it becomes possible to do so.



Writing

- Be sure to look at the samples you have been given.
- Be sure to call me at 449-1110 or e-mail me at cc1874@aol.com if you have any questions.